

CLAIMS

1. A drive system for a fuel cell (26), comprising:

a reformer (22) which generates reformate gas containing hydrogen by reforming a fuel gas and supplies the reformate gas to the fuel cell (26), and

a gas supply device (19) provided upstream of the reformer (22) which supplies a mixture of the fuel gas and air to the reformer (22) when the system is in a normal running state, wherein:

the gas supply device (19) generates a high temperature gas containing a fuel component for a reforming reaction and supplies the high temperature gas containing the fuel component for the reforming reaction to the reformer (22) when the system starts up.

2. The drive system as defined in Claim 1, further comprising:

a first fuel supply mechanism (29) which supplies fuel to the gas supply device (19), wherein:

the gas supply device (19) generates the high temperature gas containing the fuel component for the reforming reaction by burning fuel supplied from the first fuel supply mechanism (29) at a rich air fuel ratio.

3. The drive system as defined in Claim 1, further comprising:

a first fuel supply mechanism (29) which supplies fuel to the gas supply device (19),

a second fuel supply mechanism (30) which supplies fuel at downstream of the first fuel supply mechanism (29), and

a first air supply mechanism (36) which supplies air at downstream of the first fuel supply mechanism (29), wherein:

the gas supply device (19) generates the high temperature gas containing the fuel component for the reforming reaction by mixing the high temperature gas generated by burning the fuel supplied from the first fuel supply mechanism (29) with fuel supplied from the second fuel supply mechanism (30) and air supplied from the first air supply mechanism (36).

4. The drive system as defined in Claim 3, wherein:

the temperature of the high temperature gas containing the fuel component for the reforming reaction is adjusted by adjusting the fuel supply amount from the second fuel supply mechanism (30) and the air supply amount from the first air supply mechanism (36).

5. The drive system as defined in any of Claims 1-4, wherein:

supply of reformatate gas to the fuel cell (26) is shut off when the system starts up.

6. The drive system as defined in any of Claims 1-4, further comprising:

a vaporizer (28) which vaporizes fuel and supplies fuel gas to the gas supply device (19), wherein:

when the system start-up has been completed, the reformatate gas supply to the fuel cell (26) is started after the fuel supply to the vaporizer (28) has started, and the gas supply device (19) stops generation of the high temperature gas containing the fuel component for the reforming reaction.

7. The drive system as defined in Claim 3 or Claim 4, wherein:

the first air supply mechanism (36) supplies air at downstream of the second fuel supply mechanism (30).

8. The drive system as defined in Claim 7, wherein:

the second fuel supply mechanism (30) injects fuel opposite the flow of the high temperature gas generated by burning the fuel supplied from the first fuel supply mechanism (29).

9. The drive system as defined in Claim 7, wherein:

the gas supply device (19) comprises
a combustion part (20) where the fuel supplied from the first fuel supply mechanism (29) is burned and

a mixing part (21) where the high temperature gas generated by burning fuel supplied from the first fuel supply mechanism (29) is mixed with fuel supplied from the second fuel supply mechanism (30) and air supplied from the first air supply mechanism (36), and

the second fuel supply mechanism (30) supplies fuel in the center of the mixing part (21).

10. The drive system as defined in Claim 9, wherein:

the second fuel supply mechanism (30) is provided on the side face of the mixing part (21) so that it does not extend inside the mixing part (21).

11. The drive system as defined in Claims 7, wherein:

the second fuel supply mechanism (30) is provided on the downstream end face of the mixing part (21) to supply fuel against the flow of the high temperature gas.

12. The drive system as defined in any of Claim 3, 4 or 7-11, wherein:

a vaporizing plate (42) which catches and vaporizes fuel supplied from the second fuel supply mechanism (30), is provided upstream of the second fuel supply mechanism (30).

13. The drive system as defined in Claim 12, wherein:

the vaporizing plate (42) has a plurality of holes (43).

14. The drive system as defined in Claim 12, wherein:

the vaporizing plate (42) comprises plural annular plates (42a-42f) which are coaxially disposed.

15. The drive system as defined in Claim 14, wherein:

the diameter of the cross-section of one annular plate (42a-42f) increases further downstream, and the downstream diameter of the one annular plate (42a-42f) is larger than the upstream diameter of another annular plate (42b-42f) which is externally adjacent to the one annular plate (42a-42f).

16. The drive system as defined in any of Claims 1-4, further comprising:

a CO removal device (23) which removes carbon monoxide in the reformate gas generated by the reformer (22).

17. The drive system as defined in Claim 16, further comprising:

a bypass line which directly supplies the high temperature gas generated in the gas supply device (19) to the CO removal device (23), wherein:
the high temperature gas generated in the gas supply device (19) is also supplied to the CO removal device (23) when the system starts up.

18. The drive system as defined in Claim 17, further comprising:

a second air supply mechanism (37) which supplies air to the CO removal device (23), wherein:
the reformate gas generated by the reformer (22) and air from the second air supply mechanism (37) are supplied to the CO removal device (23) when the system starts up.

19. The drive system as defined in Claim 17, wherein:

the high temperature gas generated in the gas supply device (19) is supplied to the CO removal device (23) until the temperature of a CO removal catalyst in the CO removal device (23) reaches a predetermined temperature.

20. The drive system as defined in any of Claims 1-4, further comprising:

an anode exhaust combustor (27) which burns a mixture of anode exhaust containing hydrogen and cathode exhaust containing oxygen.